PROC. BIOL. SOC. WASH.
100(3), 1987, pp. 629–639

THE CAPRELLIDS (AMPHIPODA: CAPRELLIDA) OF BERMUDA: A SURVEY OF SPECIMENS COLLECTED FROM 1876–1987, INCLUDING CAVE INHABITANTS, AND THE DESCRIPTION OF *DEUTELLA ASPIDUCHA,* NEW SPECIES

Michael F. Gable and Eric A. Lazo-Wasem

Abstract.—An examination of all available specimens of Bermuda caprellids, including recently collected cave caprellids, permits a contemporary survey of the group for Bermuda waters. A new species, *Deutella aspiducha,* is described. Its transitional characters suggest the reabsorption of *Luconacia incerta* into the genus *Deutella.* Four other Bermuda caprellids (*Caprella danilevskii, C. equilibra, Hemiaegina minuta,* and *Fallotritella biscaynensis*) are reviewed, and keys are provided for all six species. Zoogeographical and evolutionary theories using cave and shallow-water specimens are not possible because of the paucity of material from the latter habitat.

Kunkel's 1910 monograph on the amphipods of Bermuda included four species of caprellids. In 1968 McCain mentioned two more species for Bermuda and summarized the small amount of information known for the six Bermuda species on habitat preferences, morphological variation, etc. Several recent factors predicate an updated treatment of the Bermuda caprellids: the discovery at the Yale Peabody Museum (YPM) of many of Kunkel's specimens (Lazo-Wasem and Gable 1987), a collection of Bermuda amphipods made in 1985, and the examination of all Bermuda caprellids housed at the United States National Museum (USNM), including specimens collected by G. Brown Goode in 1876–1877, and the cave specimens collected this decade by T. M. Iliffe of the Bermuda Biological Station. In addition, the discovery of a possibly endemic species, *Deutella aspiducha,* adds to the desirability of a reconsideration of the Bermuda caprellids.

Systematics

Full synonymies for the Bermuda caprellids are in McCain (1968); taxonomic changes since his publication are noted in this paper. Our synonymies apply only to publications that mention a species as it occurs in Bermuda. The classification schemes of McCain (1970), Bowman and Abele (1982), and Schram (1986) are used throughout this paper. Legend: major body parts are marked by abbreviations beginning with uppercase letters. Abbreviations are as follows: A, antenna; Ab, abdomen; C, cephalon; Gn, gnathopod; Md, mandible; Mx, maxilla; Mxpd, maxilliped; P, pereopod; Pn, pereonite.

Family Aeginellidae Vassilenko, 1968
Deutella Mayer, 1890, emend.

Diagnosis.—Flagellum of antenna 2 biarticulate (rarely triarticulate?), swimming setae absent; mandibular palp 3-segmented,

setal formula for terminal article 1-x-1, 1, or 2, knob on terminal article present or absent, molar present; outer lobe of maxilliped larger than inner lobe; gills on pereonites 3 and 4; pereopods 3 and 4, 2-segmented, pereopod 5, 6-segmented; abdomen of male with pair of appendages and pair of setose lobes, female with or without a pair of lobes.

Deutella aspiducha, new species
Figs. 1–3

Diagnosis.—Cephalon and pereonite 2 each with 1 dorsal, anteriorly directed spine. Males with anterior spatulate processes on pereonite 2; pereonites 3 and 4 with outwardly projecting, crenulate side plates. Insertion of pereopod 5 in both sexes, ¼ from posterior edge of pereonite 5.

Etymology of specific modifier.—From the Greek *aspiduchos* meaning "shield-bearer," in reference to the distinct and crenulate side plates on pereonites 3 and 4 of the male.

Description.—Male holotype, 4.8 mm. Cephalon with 1 dorsal, anteriorly directed spine, followed posteriorly by 2 smooth, rounded dorsal humps; posterolateral margins with small, anteriorly projecting triangular processes. Pereonite 2 with 1 middorsal, anteriorly directed spine; anterolateral margins with distinct, large, anteriorly projecting spatulate processes. Pereonites 3–7 dorsally smooth, except pereonites 3 and 4 with middorsal hump; side plates of pereonites 3 and 4 projecting ventrolaterally with margins distinctly crenulate. Eyes present, round.

Antenna 1, 46% of body length. Peduncular segment 1 broader than segment 2; peduncular ratios 1:1.3:0.7. Peduncular segments heavily circumsetose with fine setae. Flagellum 0.6 length of peduncle, of 6 or 7 articles, first article conjointed. Antenna 2, 16% of body length, swimming setae absent, flagellum 2-articulate.

Mandible with 3-segmented palp, setal formula for terminal article 1-x-1, terminal article with knob, penultimate segment with single distal seta. Left mandible with 6-toothed incisor, serrate lacinia, spine row of 3 broad and short spines, molar strong. Right mandible identical. Palp of maxilla 1 with 3 apical spines, 1 medial spine and 1 facial seta; outer lobe with 4 apical spines and 1 shorter subapical spine. Outer lobe of maxilla 2 with 4 apical setae; inner lobe with 3. Outer lobe of maxilliped narrow, long, reaching ⅓ length of palp segment 2, with 2 apical setae, 2 medial setae, and 1 facial seta; inner lobe oval, small, ⅛ length of outer, with 2 apical setae; terminal article of palp with 1 distal seta, penultimate article with no triangular projection.

Article 6 of gnathopod 1 triangular, with grasping spine, palm with few setae, a small distal notch, and a facial spine row on inner surface; dactyl extending length of palm, with straight inner margin. Gnathopod 2 strongly inserted in expanded anteroventral corner of pereonite 2; article 2 with small, proximal, medially projecting triangular process; article 6, proximal end of palm demarcated by a grasping spine, palm with a strong poison tooth proximal to a deep notch followed distally by a small notch, and more distally armed with small teeth; article 7, curved and smooth.

Pereopods 3 and 4 inserted at base of gills, 2-segmented with tiny, distal, setose segments. Pereopod 5 of 6 segments, much smaller than pereopods 6 and 7, inserted ¼ from posterior margin of pereonite 5, propodus without palm, terminal article small and setose. Pereopods 6 and 7 normal, articles 6 with grasping spines.

Abdomen with medium-sized penes, a pair of appendages with recurved spines, and a pair of setose lobes.

Female allotype, 4.2 mm. Ovigerous. All features same as those for male except as noted. Posterolateral margins of pereonite 1 without small, anteriorly projecting processes. Anteriorly projecting processes on anterolateral margins of pereonite 2, small, tooth-like. Side plates of pereonites 3 and 4 not developed.

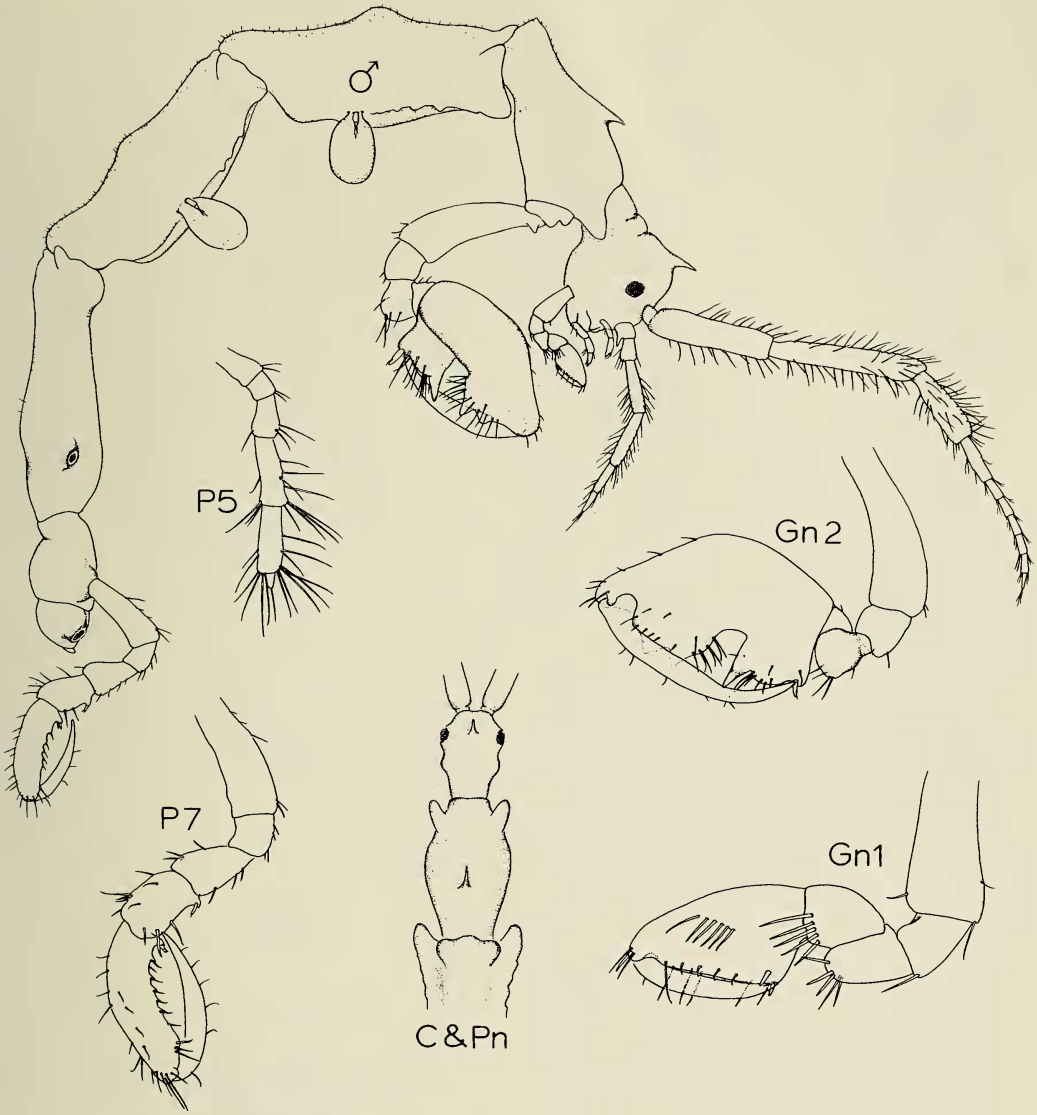

Fig. 1. *Deutella aspiducha,* male holotype. USNM 195178.

Antenna 1, 35% of body length, flagellum of 4 articles, ratio to peduncle, 0.3:1. Right antenna 2, flagellum of 2 articles, first conjointed; left flagellum of 3 articles.

Maxilliped, terminal article with 2 setae, 1 short and 1 curved.

Gnathopod 2, article 6 subquadrate, palmar margin with 2 small teeth on distal half, unnotched. Pereopods 3 and 4 inserted next to gills, both larger than those of males, both segments setose. Pereopod 5, anterior margin with tubercles. Abdomen with 2 lobes, weakly setose.

Remarks.—Even the smallest individuals of *D. aspiducha* show the beginnings of the dorsal spines on the cephalon and pereonite 2. The spatulate processes of pereonite 2 and the middorsal humps and side plate extensions of pereonites 3 and 4 in males definitely exhibit allometry, being barely visible in juveniles. The crenulations on the margins of the side plates of pereonites 3

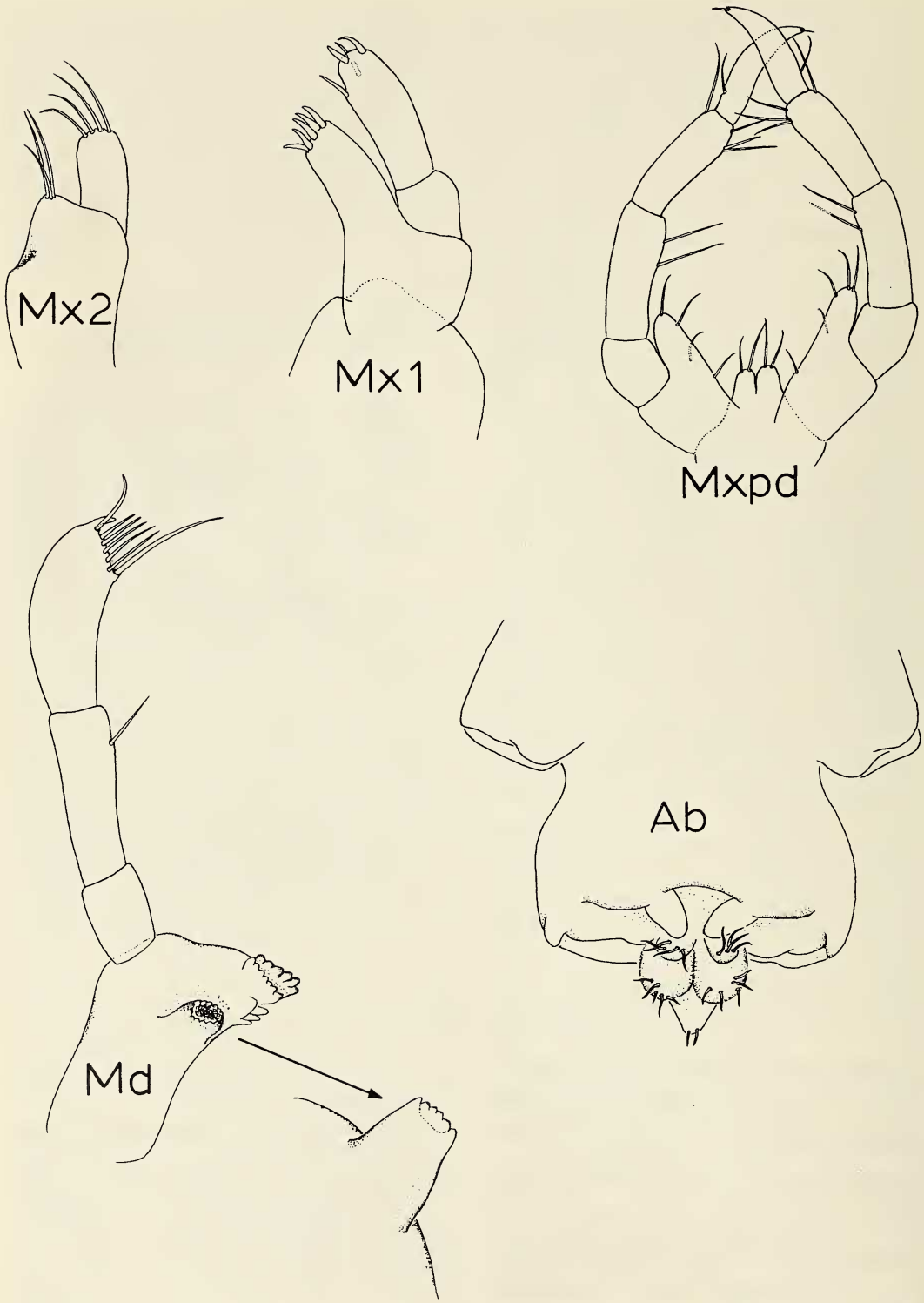

Fig. 2. *Deutella aspiducha,* male paratypes. USNM 195179: Mx1, Mx2, Md, Ab. YPM 8261: Mxpd.

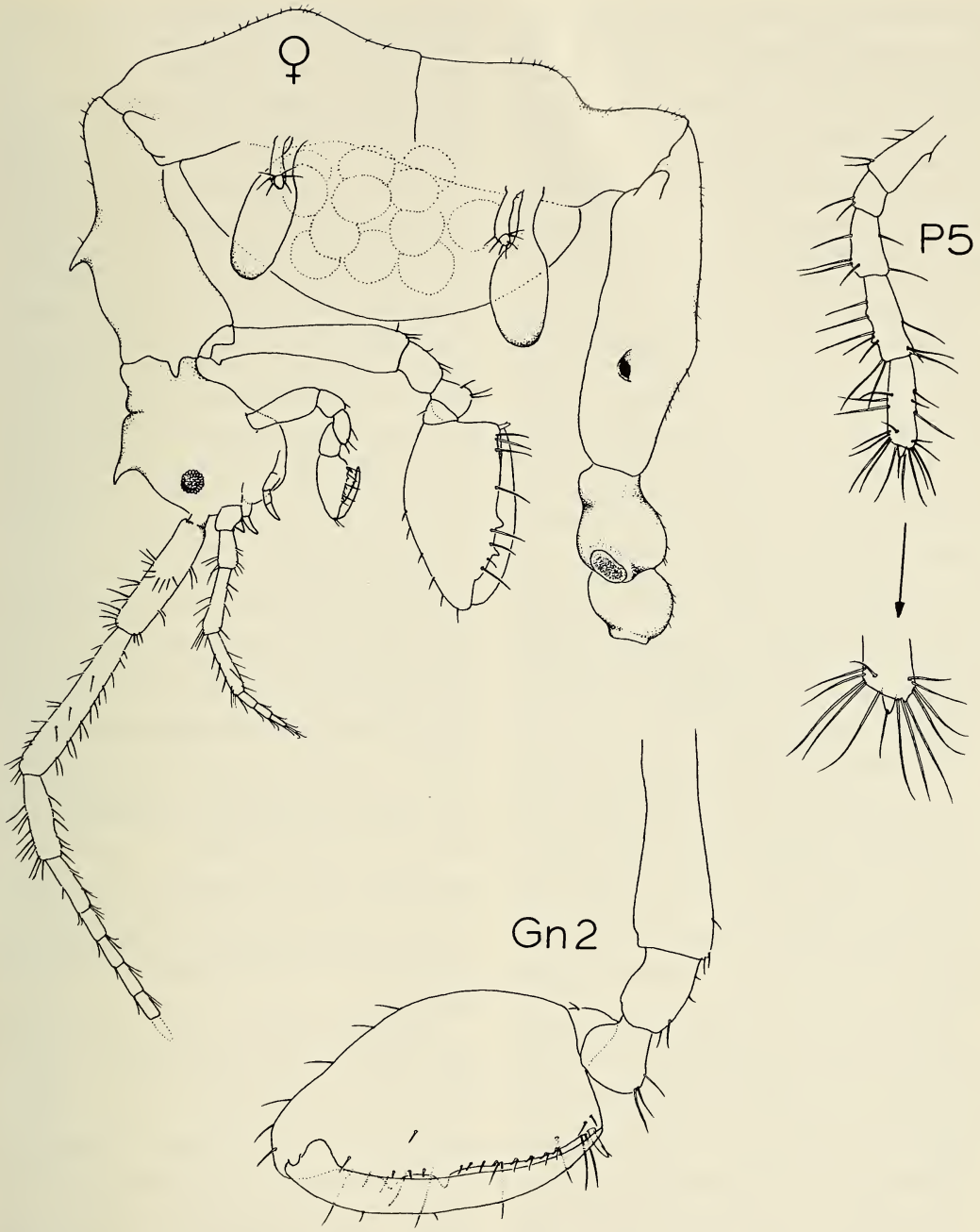

Fig. 3. *Deutella aspiducha,* female allotype. USNM 195177.

and 4 in males also become more distinct with increasing size. Females do not possess the small, projecting process on pereonite 2 until ovigerous. The possession or lack of pereonite processes, their shapes when present, and the 6th article of gnathopod 2 make this species notably sexually dimorphic.

The bodies of many of the animals, when

preserved, are bent into an inverted "U" at the junctions of pereonites 2 and 3 and pereonites 4 and 5; in some males, an additional flexion at the junction of pereonites 3 and 4 forms the animals into virtual squares. All ovigerous females exhibit a tight, inverted U-shape. Many individuals are covered thickly with flocculent detritus and morphological details can be obscured unless ultrasonically cleaned.

The female allotype, with one antenna 2 triarticulate and the other biarticulate (but with its first article conjointed) is an enigma. Most caprellid genera, other than some in the Phtisicidae, have a biarticulate flagellum on antenna 2 (McCain 1968). Of 44 other specimens of *D. aspiducha* examined, a few do appear to have a conjointed first article on antenna 2 and one male does appear to have a triarticulate flagellum. Perhaps triarticulation and conjointed articles are mere exceptions to a generally conservative feature or perhaps the occasional occurrence of these features has been overlooked in other genera.

The number of small setae in the formula for the terminal mandibular palp article varies from 4 to 5. The distal setation of the terminal maxillipedal palp varies from 1 short, to 1 short and 1 long, to 1 long. Distal setation of the palp of the maxilliped is normally characteristic of only one genus (*Paracaprella*) other than *Deutella* (McCain 1968).

Deutella aspiducha differs from all other *Deutella* species (sensu McCain 1968) by the lack of a triangular projection on the penultimate article of the palp of the maxilliped, by the shape of the last two articles of pereopod 5, and by the point of insertion of pereopod 5. The genus *Deutella,* however, exhibits a rather wide range of variation. *Deutella schieckei* Cavedini 1981 (possibly the *Deutella* sp. of Mayer (1890)), and *D. mayeri* Stebbing, 1895, are both dorsally smooth; *D. californica* Mayer, 1890 and *D. venenosa* Mayer, 1890, the only other two species in the genus, possess dorsal spines, as does *D. aspiducha.* Body spination is indeed often a variable character but even conservative characters such as the mouthparts, which McCain (1968) and Laubitz (1970) believe offer some of the best taxonomic characters, show significant variability. The same latter three species, for example, have a terminal article mandibular palp formula of 1-x-1; *D. schieckei* (Cavedini, 1981) and *D. mayeri* (McCain, 1968), however, have only one or two setae in toto on the palp. Pereopod 5 offers another example of extreme variability. Pereopod 5 of *D. venenosa* is described by Mayer (1890) as being "shortly rendered" and pereopod 5 of *D. aspiducha* is distinctly shorter than pereopods 6 and 7; the size of pereopod 5 in the other three species does not differ distinctly from that of pereopods 6 and 7.

Based on the above examples, a case for a strict generic diagnosis could be made in such a way as to eliminate any one of the *Deutella* species and allow the others to remain united. We believe that the structure and proportions of the antennae of *D. aspiducha,* most of its mouthpart morphology, the various pereonite projections, the delineation of the palm of gnathopod 2 in males, the strong anterior insertion of gnathopod 2 on pereonite 2, the shape, length, and insertion patterns of pereopods 3 and 4, and the structure of the male abdomen all link this new species to the genus *Deutella.*

Deutella aspiducha was first discovered at the YPM in a vial of specimens examined by Kunkel and labelled *Protellopsis stebbingii* Pearse, Bermuda, with no precise habitat description. That the species is indeed an inshore species was ascertained by the collection of a small male from hydroids at a 1 meter depth in 1985. Subsequent examination of Iliffe's material from Little River Cave, collected in 1982, revealed many *D. aspiducha* of both sexes at all growth stages. Because the inshore amphipod fauna of Bermuda has been so poorly surveyed and studied, however, at this time no suggestion of

a stygophilic nature should be ascribed to this species. At present, its occurrence in caves and in shallow inshore waters can be said only to support the statement of several authors (e.g., Stock 1986, Maddocks and Iliffe 1986) that species found in the marine waters of certain types of island sea caves often also occur in shallow inshore waters.

Material examined.—Male holotype, USNM 195178, Little River Cave, Bermuda, T. M. Iliffe, 8 May 1982, 4.8 mm.—Female allotype, USNM 195177, Little River Cave, Bermuda, T. M. Iliffe, 8 May 1982, 4.2 mm.—19 paratypes, USNM 195179, Little River Cave, Bermuda, T. M. Iliffe, 8 May 1982.—USNM Acc. No. 359182, Little River Cave, Bermuda, T. M. Iliffe, 8 May 1982, 152 specimens.—1 male paratype, YPM 8261, Bermuda, Dr. J. L. Cole, 15 Jul 1903.—3 male paratypes, YPM 8263, Bermuda, Dr. J. L. Cole, 15 Jul 1903.—1 male paratype, YPM 8262, Shelly Bay, Hamilton Parish, Bermuda, off promontory NNW of Bay, M. F. Gable, 3 Jun 1985, among hydroids, shallow subtidal.

Deutella incerta (Mayer) 1903
Fig. 4

Protellopsis stebbingii: Kunkel, 1910:111–113, fig. 43.
Deutella incerta: Steinberg and Dougherty, 1957:281, 285–286.
Luconacia incerta: McCain, 1968:53–54, 68–72, figs. 33–35.—McCain and Steinberg, 1970:53.—Johnson, 1986:381, fig. 125.

Remarks.—Steinberg and Dougherty (1957) synonymized the monotypic *Luconacia* of Mayer (1903) with *Deutella.* Their argument for combining the genera rested on differences between the genera that they deemed trivial, the most important of which is the form of the distal segments of pereopod 5. Steinberg and Dougherty (1957) also claimed that swimming setae were mentioned in the diagnosis of *Luconacia* (*Deutella* lacks them), but that illustrations in various papers never showed them.

Interestingly, McCain (1968) himself questioned the use of pereopods 3, 4, and 5 as generic characters, because of their various degrees of reduction. Nonetheless, he re-established *Luconacia* and claimed several important differences between the genera (yet he eliminated the presence of swimming setae from his diagnosis of *Luconacia*): apical setae are present on the terminal article of the maxillipedal palp and a projection is present on the penultimate article in *Deutella* and both are lacking in *Luconacia*; the terminal article of the mandibular palp in *Deutella* has no knobs and a setal formula of 1-x-1 or "1 or 2," and in *Luconacia* there is a knob with a formula of 1-x-1; in *Deutella* the tip of the male abdominal appendage is without papillae and fringed or not fringed, and in *Luconacia* both papillae and fringes are present; the female abdomen in *Deutella* is lobed and in *Luconacia* it is not; in *Deutella,* pereopod 5 is inserted posteriorly and in *Luconacia,* midlength; finally, the right lacinia is 5-toothed or serrate in *Deutella* and serrate in *Luconacia.*

The discovery of *D. aspiducha* provides us with a transitional form that makes a case for uniting *Deutella* and *Luconacia* once again, increasing the number of known *Deutella* species to six. *D. aspiducha* possesses apical setae on the terminal article of the maxillipedal palp yet lacks the projection on the penultimate article. The terminal article of the mandibular palp bears a knob as in *Luconacia* (sensu McCain). The tip of the male abdominal appendage of *D. aspiducha* is without papillae and is not fringed; the female abdomen is lobed. The insertion of pereopod 5 is neither midlength nor posterior in *D. aspiducha* but almost precisely halfway in between. In addition, the propodus of pereopod 5 lacks a palmar margin as does that of McCain's *Luconacia.* The right lacinia of *D. aspiducha* is serrate.

Finally, McCain's (1968) suggestion that the removal of *D. mayeri* from the genus

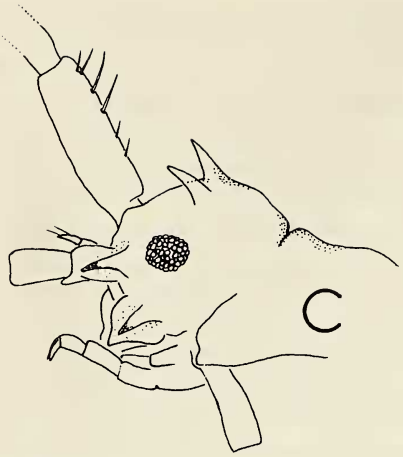

Fig. 4. *Deutella incerta.* Cephalon of female. USNM Acc. No. 359182.

would make it an exclusive Pacific Ocean genus and *Luconacia,* then, an exclusive Atlantic Ocean genus, loses a foundation for further consideration with Cavedini's (1981) discovery of the Mediterranean *D. schieckei.* Until these rather obscure, geographically widely separated and poorly studied species are much better known, we believe that the overlapping characters among them, punctuated in particular by the definitely *Deutella*-like (and *Luconacia*-similar) *D. aspiducha,* argue strongly for absorbing *Luconacia* into *Deutella.*

Many of the specimens of *D. incerta* from Bermuda of moderate to large size, both male and female, have gnathopod 2 palmar margins much more heavily setose than those figured by McCain (1968). In addition, these same specimens possess two large spines on the cephalon, one pre-ocular and one sub-ocular (Fig. 4), not figured by McCain (1968). Body spination at the species level is often of questionable taxonomic value (McCain 1968), but the invariable possession of these cephalic spines in moderate to large sized Bermuda specimens is a distinctive population character worth noting.

Deutella incerta seems to be one of the most commonly encountered caprellids in Bermuda. It has been found associated with hydroids in shallow inshore waters and in several caves. Johnson (1968) stated that it is also common on mangrove roots, *Sargassum, Thalassia,* sponges, and ascidians. The many specimens at Kunkel's disposal were presumably from non-cave waters.

Material examined.—YPM 8212, Bermuda, Dr. J. L. Cole, 15 Jul 1903, 186 specimens.—YPM 8264, Shelly Bay, Hamilton Parish, Bermuda, off promontory NNW of Bay, M. F. Gable, 3 Jun 1985, among hydroids, shallow subtidal, 1 specimen.—USNM Acc. No. 359182, Palm Cave, Bermuda, T. M. Iliffe, 13 Mar 1982, 87 specimens; Palm Cave, Bermuda, T. M. Iliffe, 13 Mar 1982, from hydroids, 4 specimens; Little River Cave, Bermuda, T. M. Iliffe, 8 May 1982, 37 specimens; Cripplegate Cave, Bermuda, T. M. Iliffe, 22 Jul 1982, 1 specimen.

Family Caprellidae White, 1847
Caprella danilevskii
Czerniavski, 1868

Caprella danilevskii: Kunkel, 1910:110–111.—McCain, 1968:22–25, fig. 10.—McCain and Steinberg, 1970:16–17.—Johnson, 1986:381, fig. 125.

Remarks.—According to McCain (1968), this species is easily distinguished from all other species of *Caprella* in the western North Atlantic by its elongate gills whose axes lie parallel to the body, by its distinctive abdomen, and by the short dactyl on male gnathopod 2. Kunkel saw no specimens of this species but relied on accounts of it for Bermuda in the Challenger Report (Stebbing 1888). Johnson (1986) claimed it is common in turtle grass in Bermuda. Despite such reports in the literature, no specimens from Bermuda were found in the available museum collections, nor were any collected recently. Because of its distinctive appearance, one can only assume that reports of its occurrence in Bermuda are accurate.

Caprella equilibra Say, 1818

Caprella equilibra: Kunkel, 1910:106–108, fig. 41.—McCain, 1968:25–30, figs. 12–13.—McCain and Steinberg, 1970:19–21.—Johnson, 1986:381, fig. 125.—Lazo-Wasem and Gable, 1987:335–336, fig. 10.
Caprella bermudia: Kunkel, 1910:108–110, fig. 42.—Lazo-Wasem and Gable, 1987: 335–336, fig. 10.

Remarks.—Every specimen examined, even the smallest, possesses the ventral tooth between the insertions of the second gnathopods. This species in Bermuda has a wide size range. *Caprella equilibra* in Bermuda is found, as is *D. incerta,* in near-shore waters and in caves. It has been collected from hydroids, and Johnson (1986) stated it is also common on bryozoans, ascidians, *Thalassia,* and algae.

Material examined.—YPM 8223, Bermuda, Dr. J. L. Cole, 15 Jul 1903, lectotype male of *C. bermudia* Kunkel (6.3 mm).—YPM 8208, Flatts Village, Bermuda, collector unknown, 4 Jul 1898, 2 males, 1 female.—YPM 8265, Shelly Bay, Hamilton Parish, Bermuda, off promontory NNW of Bay, M. F. Gable, 3 Jun 1985, among hydroids, shallow subtidal, 1 male.—USNM collection, Bermuda, G. Brown Goode, 1876–1877, 1 ovigerous female.—USNM Acc. No. 359182, Cripplegate Cave, Bermuda, T. M. Iliffe, 22 Jul 1982, 9 specimens.

Hemiaegina minuta Mayer, 1890

Hemiaegina minuta: McCain, 1968:61–64, figs. 29–30.—McCain and Steinberg, 1970:51.

Remarks.—McCain (1968) stated that *H. minuta* was found "in several localities near Bermuda," and in 1970 McCain and Steinberg gave its distribution as "off Bermuda." They also mentioned that the species had been collected in plankton tows and from *Sargassum.* Two specimens, presumably from near-shore waters, were discovered in the vial of *Protellopsis stebbingii* used by Kunkel. Two other specimens were taken intertidally from hydroids under rocks in May 1985, a time when no *Sargassum* was in evidence. Very likely, therefore, *H. minuta* is a permanent inshore inhabitant of Bermuda waters, even if new populations arrive with each wash of *Sargassum.*

Specimens collected from such an inshore *Sargassum* wash in January 1987 by T. M. Iliffe greatly exceeded the maximum sizes given by McCain (1968). Iliffe collected a male of 4.8 mm length (McCain's largest male = 4.0 mm) and an ovigerous female of 5.4 mm length (McCain's largest female = 3.2 mm). Personal observation of thousands of specimens of *H. minuta* from New England waters always attested to the specific epithet chosen by Mayer; perhaps if he had seen some of the Bermuda specimens the epithet chosen would have been different.

Material examined.—YPM 8240, Bermuda, Dr. J. L. Cole, 15 Jul 1903, 2 specimens.—YPM 8266, Whalebone Bay, St. George's, Bermuda, A. J. Baldinger, 22 May 1985, hydroids under rock, 2 specimens. Non-catalogued: St. George's, Bermuda, T. M. Iliffe, 10 Jan 1987, *Sargassum,* 8 specimens.

Family Dodecadidae Vassilenko, 1968
Fallotritella biscaynensis
McCain, 1968

Fallotritella biscaynensis McCain, 1968:57–61, figs. 27–28.—McCain and Steinberg, 1970:51.

Remarks.—McCain (1968) stated that this species is difficult to detect because of its small size and its usual covering of detritus. The five specimens we examined were indeed all detritus-covered; special care by one not familiar with caprellids would be necessary in dealing with this species so as not to confuse it with *D. aspiducha.* The only habitat records for the species are from red algae (McCain 1968); one of our specimens

was taken from *Avrainvillea,* a green alga, and two other specimens were collected from *Thalassia.*

Material examined. —YPM 8267, Ferry Reach, St. George's, Bermuda, cove W of BBS, M. F. Gable, 28 May 1985, from *Avrainvillea,* 1 female.—YPM 8268, Shelly Bay, Hamilton Parish, Bermuda, off promontory NNW of Bay, M. F. Gable, 3 Jun 1985, from mixed subtidal algae, 1 female.—USNM Acc. No. 346847, Ferry Reach, Bermuda, adjacent to W side of dock at BBS, M. L. Jones, 2 Sep 1983, Cohen net through *Thalassia,* 1 juvenile female.—USNM Acc. No. 359182, Castle Harbour, Bermuda, T. M. Iliffe, 24 Aug 1984, 1 male. Non-catalogued: Ely's Harbour, Bermuda, T. M. Iliffe, 21 Nov 1986, from *Thalassia,* 1 male.

Key to the Caprellids of Bermuda
(Pereopods 5, 6, and 7 present)

1. Pereopod 5 much smaller than 6 and 7, not inserted posteriorly on pereonite, terminal segment not claw-like 2
– Pereopod 5 similar to 6 and 7 in size or, if shorter and thinner, with a claw-like terminal segment 3
2. Insertion of pereopod 5 at mid-segment; peduncular segments of antenna 1 with few setae ..... *Deutella incerta*
– Insertion of pereopod 5 75% back from front edge of segment; peduncular segments of antenna 1 heavily setose ..... *Deutella aspiducha* n. sp.
3. Pereopods 3 and 4 present, of only 1 segment, animal seldom longer than 6 mm 4
– Pereopods 3 and 4 absent, no mandibular palp, animal can be much larger than 6 mm 5
4. Dorsal surface of body with spines, at least on head ..... *Fallotritella biscaynensis*
– Animal usually with all appendages splayed out in same plane as body, dorsal body with no spines; 2 teeth between insertions of 2nd gnathopods ..... *Hemiaegina minuta*
5. Gills with long axis parallel to body, dactyl (last segment) of male 2nd gnathopod less than half as long as article 6 ..... *Caprella danilevskii*
– Gills normal, long axis perpendicular to body; ventral tooth prominent between insertions of 2nd gnathopods ..... *C. equilibra*

Key to the Caprellids of Bermuda
(Pereopods 5, 6, and 7 missing)

1. Pereopods 3 and 4 present, small, of only 1 or 2 segments 2
– Pereopods 3 and 4 absent 5
2. Pereopods 3 and 4 of 1 segment .. 3
– Pereopods 3 and 4 of 2 segments, mandibular palp present 4
3. Dorsal surface of body with spines, at least on head ..... *Fallotritella biscaynensis*
– Animal usually with all appendages splayed out in same plane as body, no dorsal body spines; 2 teeth between insertions of 2nd gnathopods ..... *Hemiaegina minuta*
4. Insertion of pereopod 5 (even if missing) 75% back from front edge of segment; peduncular segments of antenna 1 heavily setose ..... *Deutella aspiducha* n. sp.
– Insertion of pereopod 5 (even if missing) at mid-segment; peduncular segments of antenna 1 with few setae ..... *Deutella incerta*
5. Gills with long axis parallel to body, dactyl (last segment) of male 2nd gnathopod less than half as long as article 6 ..... *Caprella danilevskii*
– Gills normal, long axis perpendicular to body; ventral tooth prominent between insertions of 2nd gnathopod ..... *C. equilibra*

Summary

The caprellid fauna of Bermuda has been poorly and only incidentally collected and studied. Although not rich in numbers of species, some of the species so far discovered raise interesting taxonomic questions, as indicated in this paper. The Bermuda caprellids also raise several interesting ecological questions. As the collections of T. M. Iliffe demonstrate, for example, significant populations exist in many of the island caves, yet no evolutionary conclusions can be drawn because the inshore fauna has been virtually neglected.

Acknowledgments

The authors thank Dr. J. L. Barnard (USNM) for the loan of material, Dr. T. M. Iliffe (BBS) for the collection of additional specimens, Dr. M. A. Levin (ECSU) for technical assistance, and Pedro Rivas-Diaz (ECSU) for translation of Cavedini's paper. This study has been supported in part by a Connecticut State University Research Grant to the first author. Contribution No. 1131 from the Bermuda Biological Station for Research.

Literature Cited

Bowman, T. E., and L. G. Abele. 1982. Classification of the Recent Crustacea.—Pp. 1–24 *in* D. E. Bliss, ed., The Biology of Crustacea, vol. 1, L. G. Abele, ed., Systematics, the fossil record, and biogeography. Academic Press, New York.

Cavedini, P. 1981. Contributo alla conoscenza dei caprellidi del Mediterraneo (Crustacea, Amphipoda).—Bolletino del Museo Civico di Storia Naturale di Verona 8:493–531.

Johnson, S. E. 1986. Order Amphipoda. Pp. 372–381 *in* W. Sterrer, ed., Marine fauna and flora of Bermuda. John Wiley & Sons, New York.

Kunkel, B. W. 1910. The Amphipoda of Bermuda.—Transactions of the Connecticut Academy of Arts and Sciences 16:1–116.

Laubitz, D. R. 1970. Studies on the Caprellidae (Crustacea, Amphipoda) of the American North Pacific.—National Museum of Natural Sciences. Publications in Biological Oceanography No. 1:i–vii + 1–89.

Lazo-Wasem, E. A., and M. F. Gable. 1987. A review of recently discovered type specimens of Bermuda Amphipoda (Crustacea: Peracarida) described by B. W. Kunkel (1882–1969).—Proceedings of the Biological Society of Washington 100:321–336.

Maddocks, R. F., and T. M. Iliffe. 1986. Podocopid Ostracoda of Bermudian caves.—Stygologia 2: 26–76.

Mayer, P. 1890. Die Caprelliden des Golfes von Neapel und der angrenzenden Meeres-Abschnitte. Eine Monographie. Nachtrag zur Monographie derselben.—Fauna und Flora des Golfes von Neapel 17:vii + 157 pp.

McCain, J. C. 1968. The Caprellidae (Crustacea: Amphipoda) of the western North Atlantic.—Bulletin of the United States National Museum 278: i–vi + 1–147.

———. 1970. Familial taxa within the Caprellidea (Crustacea: Amphipoda).—Proceedings of the Biological Society of Washington 82:337–342.

———, and J. E. Steinberg. 1970. Caprellidae I. Family Caprellidae. Pp. 1–78 *in* H.-E. Gruner and L. B. Holthius, eds., Crustaceorum Catalogus. Amphipoda I, part 2. The Hague, The Netherlands: Dr. W. Junk Publishers.

Schram, F. R. 1986. Crustacea. Oxford University Press, New York. 606 pp.

Stebbing, T. R. R. 1888. Report on the Amphipoda collected by H.M.S. *Challenger* during the years 1873–76.—Report on the Scientific Results of the Voyage of H.M.S. *Challenger* during the years 1873–76, Zoology 29:xxiv + 1737 pp., 210 pls.

Steinberg, J. E., and E. C. Dougherty. 1957. The skeleton shrimps (Crustacea: Caprellidae) of the Gulf of Mexico.—Tulane Studies in Zoology 5:267–288.

Stock, J. H. 1986. Two new amphipod crustaceans of the genus *Bahadzia* from 'blue holes' in the Bahamas and some remarks on the origin of the insular stygofaunas of the Atlantic.—Journal of Natural History 20:921–933.

(MFG) Department of Biology, Eastern Connecticut State University, Willimantic, Connecticut 06226-2295; (EAL-W) Division of Invertebrate Zoology, Peabody Museum of Natural History, Yale University, 170 Whitney Avenue, P.O. Box 6666, New Haven, Connecticut 06511-8161.